Overview of Toxicity Risks to Migratory Adult & Juvenile Chinook Through Lake Union

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Study Area

Methodology

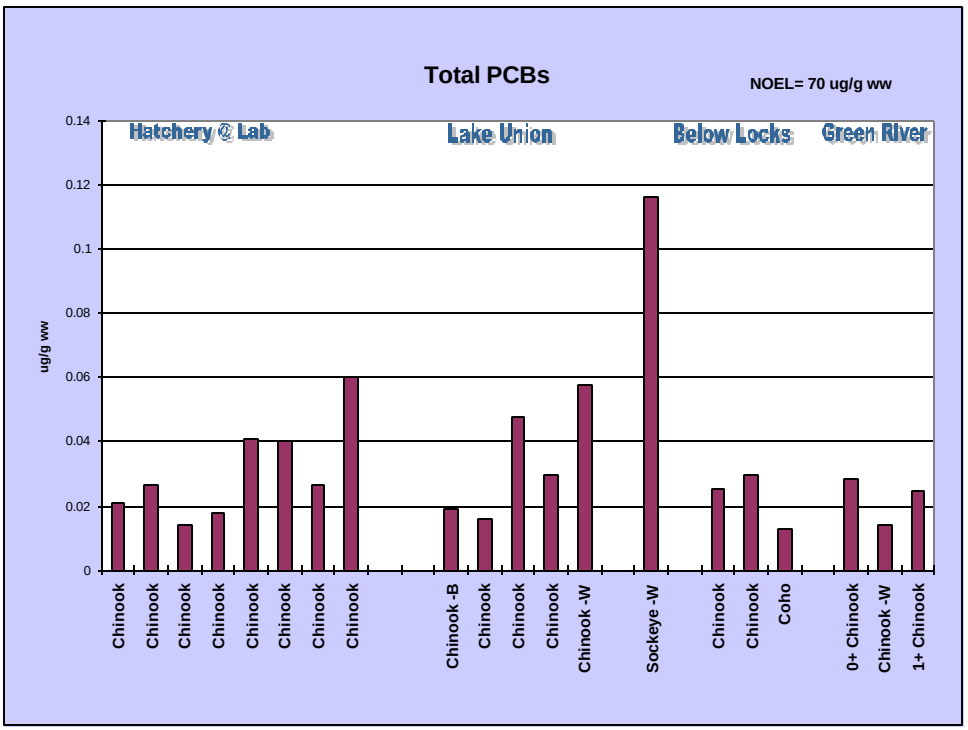
- Collect Mortalities for Juvenile salmon from Lake Wa. & Green River - ‘00 & ‘01 -- Whole Body Chemistry
- Collect resident fish and crayfish ‘91, ‘97, & ‘99 -- Edible Tissue
- Review one year of bi-weekly samples ‘91
- Review five years of quarterly samples ‘97-’02

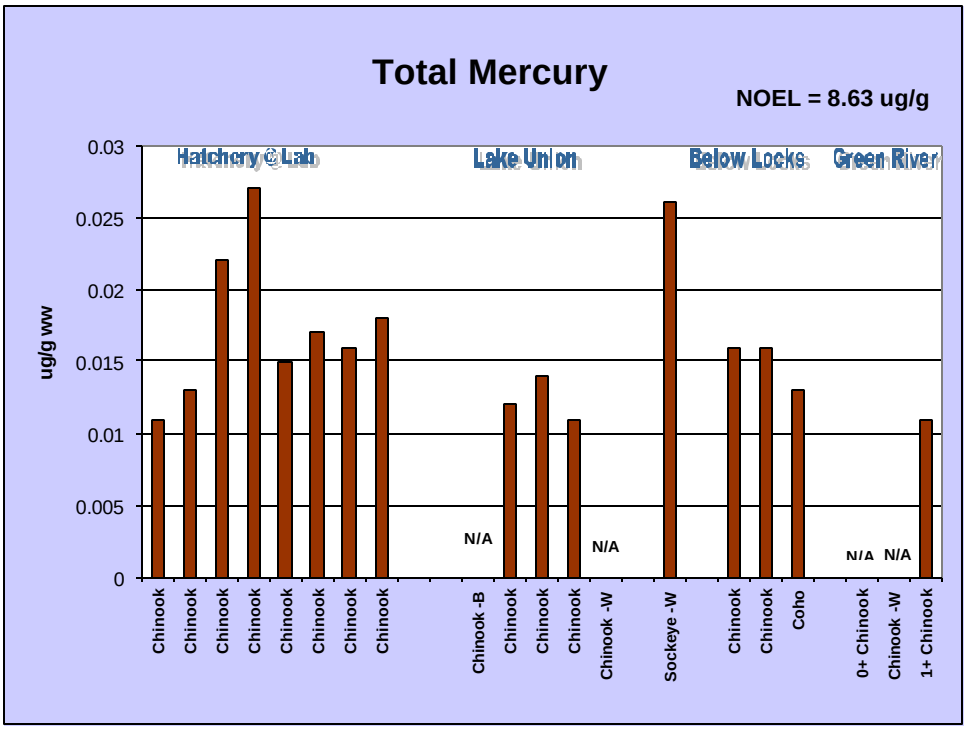
Objectives

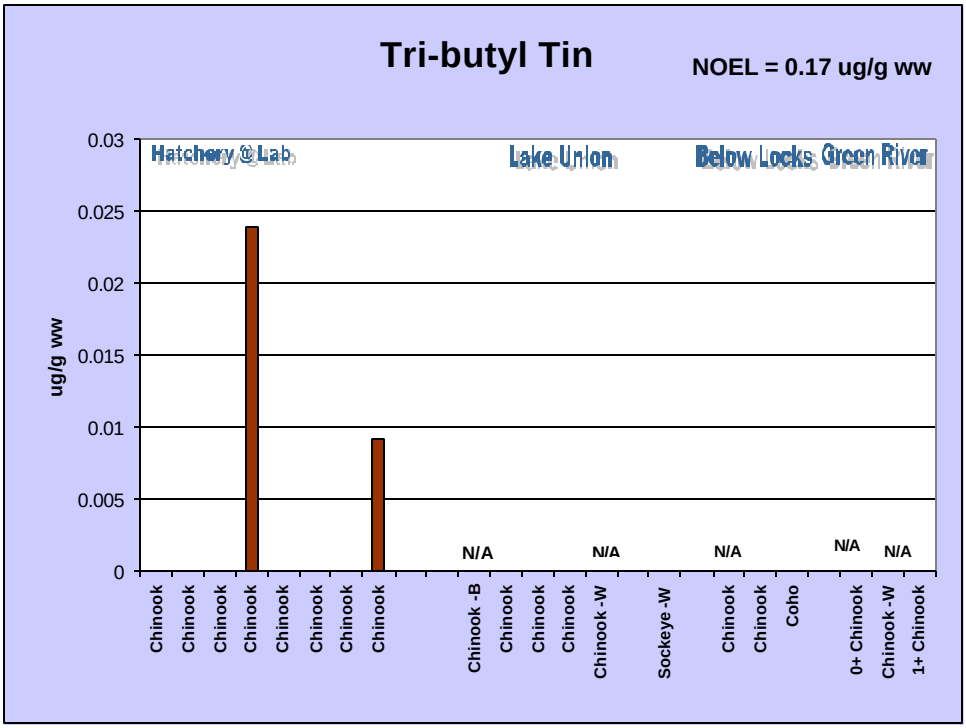
- Collect basic information on whole body chemistry for PCBs, Hg, & TBT
- Determine if there is an increase as result of traversing Lake Union
- Determine if levels exceed any known effect levels
- Determine if acute toxicity is issue

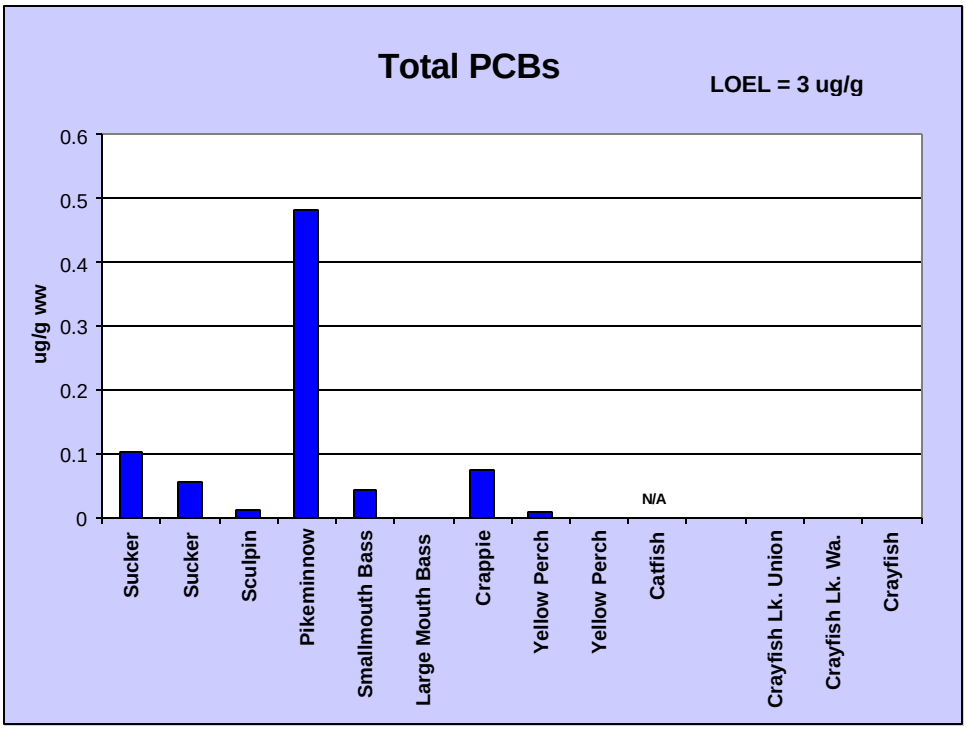
References

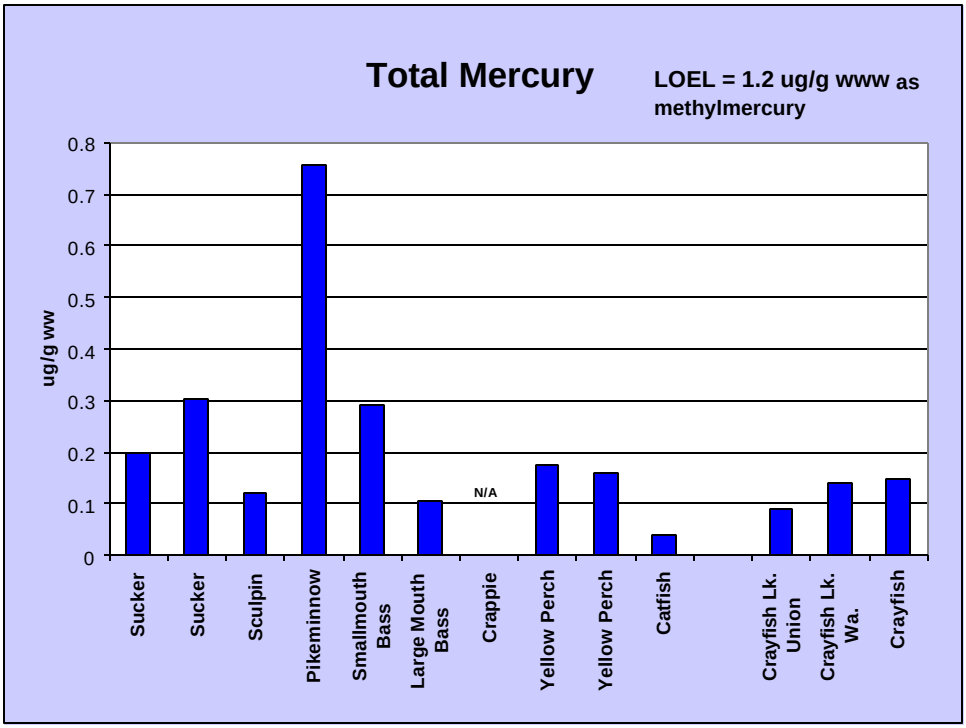
- Phase I Ecological Risk Assessment A.3-A.6 Exposure and Effects Assessments, Final Draft, Windward, Dec. 2002
- Review of Tissue Residue Effects Data for Tributyltin, Mercury, and PCBs, EVS, 1999

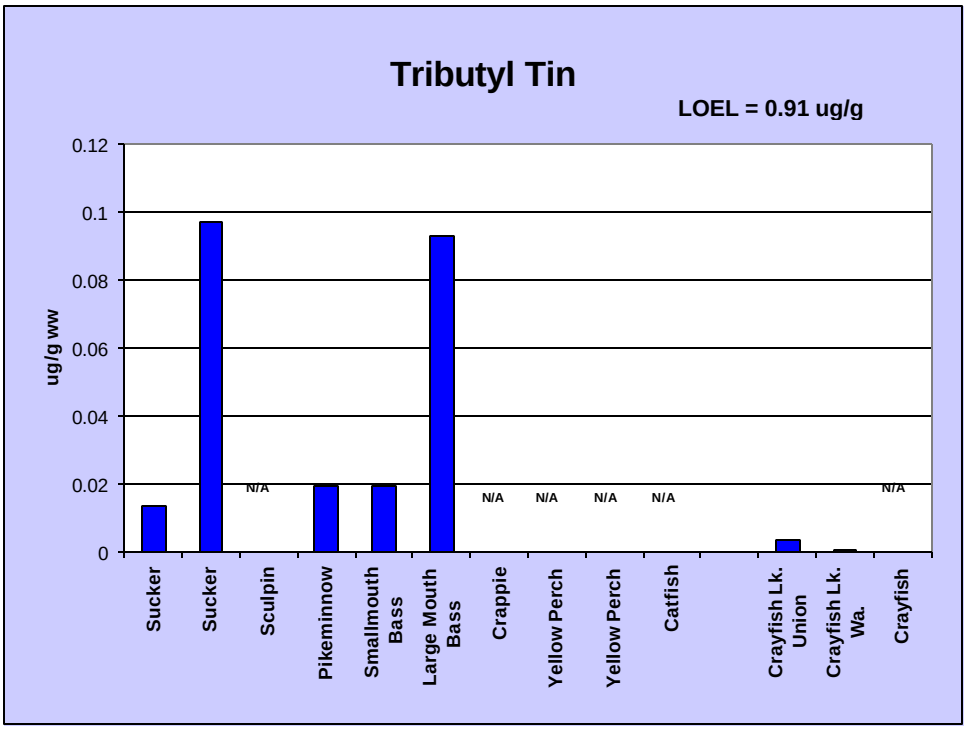


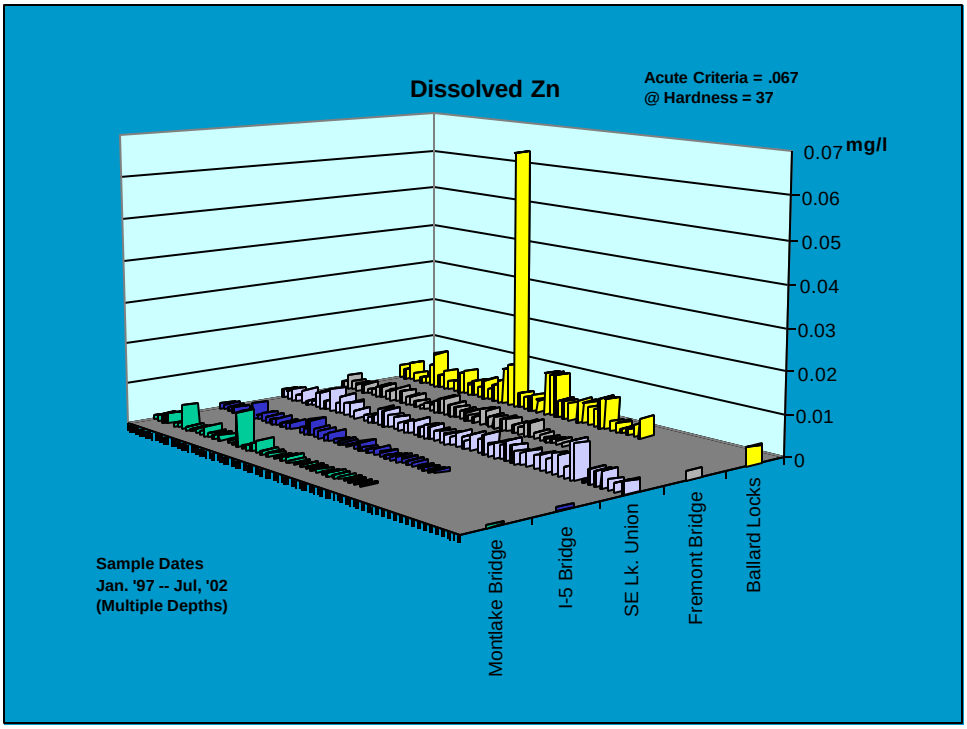

Total Mercury
NOEL = 8.63 ug/g
ug/g ww
0.03
0.025
0.02
0.015
0.01
0.005
0
Hatchery @ Lab
Lake Union
Below Locks
Green River
N/A
N/A
N/A
N/A
Chinook
Chinook
Chinook
Chinook
Chinook
Chinook
Chinook
Chinook
Chinook -B
Chinook
Chinook
Chinook
Chinook -W
Sockeye -W
Chinook
Chinook
Coho
0+ Chinook
Chinook -W
1+ Chinook

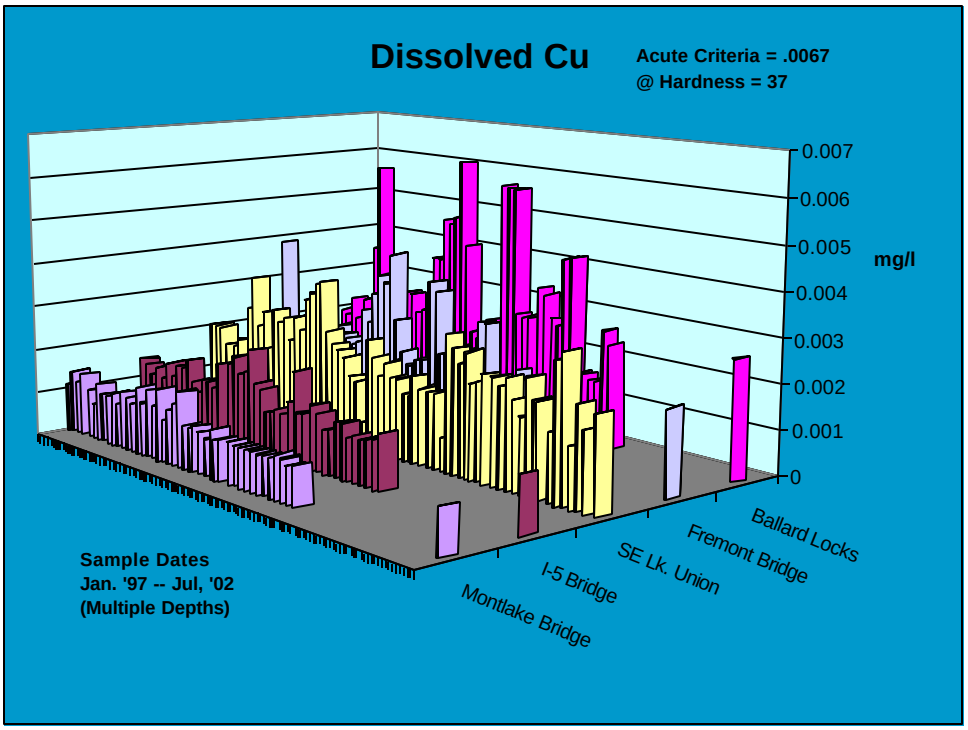

Tri-butyl Tin
NOEL = 0.17 ug/g ww
ug/g ww
0.03
0.025
0.02
0.015
0.01
0.005
0
Hatchery @ Lab
Lake Union
Below Locks
Green River
N/A
N/A
N/A
N/A
N/A
Chinook
Chinook
Chinook
Chinook
Chinook
Chinook
Chinook
Chinook -B
Chinook
Chinook
Chinook
Chinook -W
Sockeye -W
Chinook
Chinook
Coho
0+ Chinook
Chinook -W
1+ Chinook


Total PCBs
LOEL = 3 ug/g
ug/g ww
0.6
0.5
0.4
0.3
0.2
0.1
0
N/A
Sucker
Sucker
Sculpin
Pikeminnow
Smallmouth Bass
Large Mouth Bass
Crappie
Yellow Perch
Yellow Perch
Catfish
Crayfish Lk. Union
Crayfish Lk. Wa.
Crayfish


Total Mercury
LOEL = 1.2 ug/g www as methylmercury
ug/g ww
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
N/A
Sucker
Sucker
Sculpin
Pikeminnow
Smallmouth Bass
Large Mouth Bass
Crappie
Yellow Perch
Yellow Perch
Catfish
Crayfish Lk. Union
Crayfish Lk. Wa.
Crayfish


Tributyl Tin
LOEL = 0.91 ug/g
ug/g ww
0.12
0.1
0.08
0.06
0.04
0.02
0
N/A
N/A
N/A
N/A
N/A
N/A
Sucker
Sucker
Sculpin
Pikeminnow
Smallmouth Bass
Large Mouth Bass
Crappie
Yellow Perch
Yellow Perch
Catfish
Crayfish Lk. Union
Crayfish Lk. Wa.
Crayfish


Dissolved Zn
Acute Criteria = .067
@ Hardness = 37
mg/l
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Sample Dates
Jan. '97 -- Jul, '02
(Multiple Depths)
Montlake Bridge
I-5 Bridge
SE Lk. Union
Fremont Bridge
Ballard Locks



Conclusions

Juvenile chinook

- Class 1 and 0 hatchery chinook had similar concentrations for PCBs
- Juvenile sockeye entering Lake Union had significantly more PCBs than chinook
- There was no apparent increase in PCBs, Hg or TBT as a result of traversing Lk. Union
- All whole body values were well below LOEL concentrations for juvenile chinook

Conclusions

Resident Fish & Crayfish

- Resident fish and crayfish had roughly an order of magnitude higher edible tissue concentrations over juvenile chinook
- All of the resident fish and crayfish were below LOEL for fresh water fish for PCB, Hg, & TBT.

Conclusions

Water Column

- A single dissolved zinc value in front of the Locks exceeded the acute criteria.
- A number of dissolved copper values in front of the Locks approached the acute criteria and 7 of 47samples exceeded the chronic criteria
- Dissolved copper may be an issue for resident fish within Salmon Bay.